

**NEW NEOTROPICAL NEOBALINAE WITH KEYS TO THE GENERA  
AND TO THE SPECIES OF CONALA**  
(Homoptera: Cicadellidae)

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The subfamily Neobalinae was erected by Linnavuori (1959: 17-32) to receive a group of tropical American leafhoppers whose members had been variably placed in several different subfamilies by past workers. Linnavuori provided excellent keys to genera and species of the then known members of the subfamily.

This paper contains descriptions of ten new species as follows: Two *Conala*, two *Calliscarta*, one *Perubala*, three *Neobala*, and two representing two new genera, *Rhobala* and *Psibala*. Keys to the genera and species of *Conala* are provided. All of the material reported upon is in the collection of the United States National Museum.

A brief diagnosis of the Neobalinae is difficult, but members of the subfamily can usually be distinguished by the following combination of characters: Ocelli on anterior margin of crown, crown without dense microsculpturing, anterior branch of tentorium simple, male pygofer without a membranous fold laterally. For a complete definition of the Neobalinae, see Linnavuori (1959: 17).

**Neobalinae: KEY TO GENERA**

1. Crown strongly produced triangularly beyond eyes ..... 2  
Crown of uniform length or only slightly produced at middle ..... 3
2. Pronotum with distinct transverse rugulae for entire width, posterior margin sharply indented ..... **Conala** Oman  
Pronotum smooth or with weakly defined mesal rugulae, posterior margin not sharply indented ..... **Benala** Oman
3. Forewing truncated at apex ..... 4  
Forewing rounded at apex ..... 5
4. Forewing with three closed preapical cells ..... **Calliscarta** Stål  
Forewing with one closed preapical cell ..... **Exolidia** Osborn
5. Ocellocular area without a distinct ledge; aedeagus slender with a pair of apical appendages ..... **Perubala** Linnavuori  
Ocellocular area with a distinct ledge; aedeagus, usually stout, simple or variously modified with appendages ..... 6
6. Anterior margin of crown with a fine but distinct transverse carina between ocelli; forewing with three closed preapical cells ..... **Rhobala** n.g.  
Anterior margin of crown without a carina of any sort; forewing with three or less closed preapical cells ..... 7
7. Crown bluntly angular in dorsal view; aedeagus with a single asymmetrical apical appendage ..... **Psibala** n.g.  
Crown rounded in dorsal view; aedeagus simple or with paired symmetrical basal or lateral appendages ..... **Neobala** Oman<sup>1</sup>

<sup>1</sup>The generic definition of *Neobala* (Linnavuori 1959: 23) is expanded here to include species with aedeagal appendages and setae on pygofer present or absent, and with one to three closed preapical cells in the forewing.

**Conala: KEY TO SPECIES<sup>2</sup>**

1. Pronotum with four orange-red longitudinal stripes; forewings grayish hyaline; apex of style with two or more prongs (Fig. 10)..... 2  
 Pronotum with five orange-red longitudinal stripes; forewings brown hyaline; apex of style without prongs (Fig. 4)..... **tijucata** n. sp.
2. Length of male less than 5 mm.; pygofer with macrosetae (Fig. 9); stylar apex with three prongs and a preapical hyaline lobe (Fig. 8)  
 ..... **corumbana** n. sp.
- Length of male 5.5 mm.; pygofer without macrosetae; stylar apex with two prongs (Fig. 10)..... **fasciata** (Osborn)

**Conala tijucata, new species**

(Figs. 1-5)

*Length:* Male 5.25 mm. Female 5.75 mm.

*Coloration:* Ground color of venter including legs and face stramineous to yellow. Female without additional dark markings. Male with proximal half of all femora dark brown to black, sides of thorax touched with black, middle of face including clypellus, lora, and most of clypeus black. Both sexes with an orange-red transverse stripe between eyes on uppermost portion of clypeus, stripe follows angular curvature of head. Dorsum of both sexes alike. Ground color of crown, pronotum, and scutellum sordid stramineous to yellow. Crown with four orange-red longitudinal stripes, two of which converge on each side at apex producing two V-shaped markings. Pronotum with five orange-red longitudinal stripes, the outermost two on each side, extensions of coronal markings. Scutellum with three orange-red longitudinal stripes, extensions of three central pronotal stripes. Forewings brown hyaline with veins slightly darker.

*Male Genitalia:* Genital capsule in lateral view with apical setae and lobe on ventral margin of pygofer (Fig. 2). In ventral view connective Y-shaped and aedeagus constricted at middle, very finely serrated distally and with a pair of slender lateral processes (Fig. 3). Aedeagus in lateral view robust, curving dorsally toward apex, and with a distinct, pointed ventral portion between the pair of slender straight lateral processes (Fig. 1). Style long, slender, and with apex somewhat avicephaliform, but simple (Figs. 4 and 5).

*Female Genitalia:* Posterior margin of pregenital sternum trilobed, central lobe most strongly produced and notched mesally.

*Types:* Holotype male (USNM Type No. 34867) Floresta da Tijuca, D. Federal, Brazil, July, 1957, M. Alvarenga. Allotype female and one paratype male with the same data.

*Discussion:* The characters used in the key will separate *tijucata* from the other members of *Conala*. Although only the style is mentioned in the key, other genital structures afford many features which will further differentiate this species.

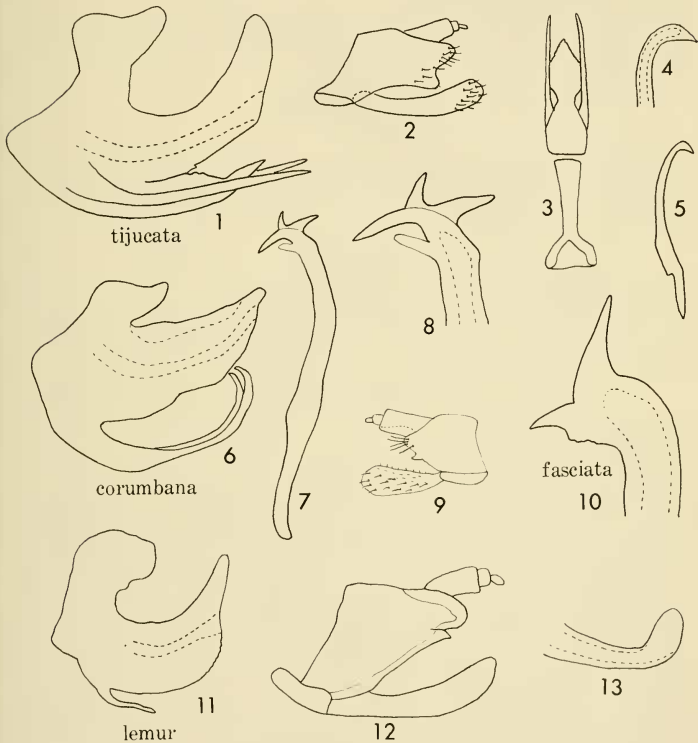
<sup>2</sup>The generic definition of *Conala* (Linnavuori 1959: 18) is modified here to include species with or without macrosetae on the pygofer. All of the known species are Brazilian.

**Conala corumbana**, new species  
(Figs. 6-9)

*Length:* Male 4.80 mm.

*Coloration:* As in *fasciata* (Osborn) except as follows: Dark markings of face less extensive; orange-red markings of dorsum finer and more sharply delineated.

*Male Genitalia:* Genital capsule in lateral view with apical setae and an acute



**Conala tijucata** n. sp. Fig. 1, lateral view of aedeagus; fig. 2, lateral view of genital capsule; fig. 3, ventral view of connective and aedeagus; fig. 4, stylar apex ventrally; fig. 5, ventral view of style. **C. corumbana** n. sp. Fig. 6, lateral view of aedeagus; fig. 7, lateral view of style; fig. 8, stylar apex laterally; fig. 9, lateral view of genital capsule. **C. fasciata** (Osborn) Fig. 10, stylar apex laterally. **Rhobala lemur** n. sp. Fig. 11, lateral view of aedeagus; fig. 12, lateral view of genital capsule (setae of plate omitted); fig. 13, stylar apex laterally. Note: Drawings made at various magnifications.

lobe on ventral margin (Fig. 9). Connective Y-shaped. Aedeagus in lateral view robust, narrowed at extreme apex, and with a pair of slender lateral processes gradually recurving toward apex (Fig. 6). Style long, slender, with three distinct apical prongs and a preapical hyaline lobe (Figs. 7 & 8).

*Female Genitalia*: Female unknown.

*Types*: Holotype male (USNM Type No. 34868) Corumba, Brazil, April, no year, Carl F. Baker.

*Discussion*: As in the preceding species, there are additional differences in the male genital structures which could be used in keying *corumbana*.

#### ***Conala fasciata* (Osborn)**

(Fig. 10)

This species was fully treated by Linnavuori (1959: 18-19). Only the stylar apex has been redrawn here (Fig. 10) for ease in running the key. Linnavuori's work should be consulted for a description and figures of other parts of the male genitalia.

#### ***Rhobala*, new genus**

Type of genus: *Rhobala lemur*, new species.

Characters as in *Calliscarta* (Linnavuori 1959: 27) with the following exceptions. Apex of forewing rounded; crown with a fine but distinct transverse carina between ocelli; male plates with macrosetae but without long hairs.

#### ***Rhobala lemur*, new species**

(Figs. 11-13)

*Length*: Male 6.5-7.00 mm.

*Coloration*: Venter including legs and face stramineous to pale brown, venter of thorax touched with dark brown or black, clypeus with numerous dark brown to black vermiculate short stripes or irregular spots, each lorum with a small dark brown to black spot next to clypeus, three or four dark brown to black spots flanking inner margin of each eye. Ground color of crown, pronotum, and scutellum same as venter, crown lightly marked with irregular pale brown to black spots and lines, pronotum with extensive markings in form of irregular vermiculate pale brown to black lines, scutellum with anterior angles and midline variably darkened. Forewings milky hyaline with all veins dark brown.

*Male Genitalia*: Genital capsule in lateral view quite simple with a small but distinct notch ventrally near apex of pygofer (Fig. 12). Macrosetae of plates in disorder. Connective more or less T-shaped. Aedeagus in lateral view stout with ventral margin finely serrated below gonopore, narrowed distally, and with a single short slender basal appendage (Fig. 11). Style slender with apex bluntly oval in lateral view (Fig. 13).

*Female Genitalia*: Female unknown.

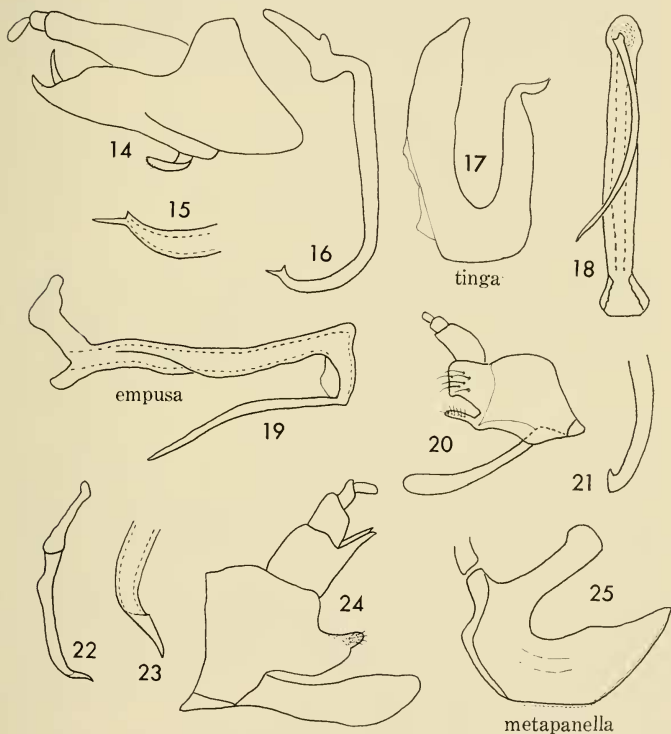
*Types*: Holotype male (USNM Type No. 34876) Huachi Beni, Bolivia, September, 1921. Mulford Biol. Expedition. Wm. M. Mann. One paratype male Chapada, Brazil, September (no year), C. F. Baker collection.

**Calliscarta tinga**, new species

(Figs. 14-17)

*Length*: Male 10 mm.

*Coloration*: Venter and legs pale brown to yellow, thorax touched with black ventrally. Genae, lora, and clypellus yellow, suture between clypeus and lower face black, clypeus and crown with ground color pale purplish-gray, combined clypeal-



**Calliscarta tinga** n. sp. Fig. 14, lateral view of pygofer and anal tube; fig. 15, stylar apex ventrally; fig. 16, ventral view of style; fig. 17, lateral view of aedeagus. **Psibala empusa** n. sp. Fig. 18, ventral view of aedeagus; fig. 19, lateral view of aedeagus; fig. 20, lateral view of genital capsule (setae of plate omitted); fig. 21, stylar apex ventrally. **Neobala metapanella** n. sp. Fig. 22, lateral view of style; fig. 23, stylar apex laterally; fig. 24, lateral view of genital capsule (setae of plate omitted); fig. 25, lateral view of aedeagus. Note: Drawings made at various magnifications.

coronal area with four broad transverse red-orange bands, the lowermost band broken at middle and only the uppermost band visible dorsally as a marking between the eyes. Pronotum grayish-orange with three pale longitudinal stripes none of which touch anterior or posterior margins, scutellum grayish-orange with a pair of poorly defined purplish longitudinal stripes. Forewings tan suffused with orange, two or three transverse brown bands at apex.

*Male Genitalia*: Lateral view of pygofer with dorsal margin strongly indented and with two sharp upright projections, one apical and one preapical (Fig. 14). Valve, plates, and connective typical of genus. Aedeagus in lateral view narrowly U-shaped with irregular projections in area of gonopore (Fig. 17). Style in ventral view nearly uniformly slender and curved outward distally, and with apex twice-pronged (Figs. 15 and 16).

*Female Genitalia*: Female unknown.

*Type*: *Holotype* male (USNM Type No. 34870) Tingo Maria, Peru, October 10, 1944, E. J. Hambleton.

*Discussion*: The color pattern and male genitalia are distinctive.

#### Psibala, new genus

Type of genus: *Psibala empusa*, new species.

Characters as in *Neobala* (Linnavuori 1959: 23) with modifications as indicated in key to genera. Differs from *Neobala* in having the crown bluntly angular in dorsal view and with length at middle distinctly longer than next to eye. Male genitalia differ in having a single asymmetrical appendage at apex.

#### *Psibala empusa*, new species

(Figs. 18-21)

*Length*: Male 5.25 mm.

*Coloration*: Ground color of venter including legs and face stramineous to yellow, touched with brown on legs and thoracic venter, face unmarked except for transverse wavy red-orange band between eyes above antennal bases. Ground color of crown, pronotum, and scutellum gray, crown with transverse, red-orange band at extreme apex between eyes and a pair of highly irregular angular red-orange discal markings, pronotum with four irregular longitudinal, red-orange stripes the outer pair doubled with all more or less fusing at anterior and posterior margins, scutellum red-orange mesally. Forewings gray hyaline, clavus marked near base irregularly with red-orange, and distally with brown, corium with a subrectangular brown marking extending from middle of claval suture to costal margin, a second similarly shaped but much smaller marking anterior to first, costal margin with two small brown spots near base, distal portion with a large H-shaped marking, sides of "H" parallel to the two anterior markings.

*Male Genitalia*: Genital capsule in lateral view with posterior margin of pygofer deeply excavated forming a small ventral portion and a large dorsal portion, both portions setose (Fig. 20). Macrosetae of plates in disorder on venter. Connective approximately Y-shaped. Aedeagus in lateral view subrectangular, not stout, apex projecting ventrally with a single long basally directed appendage (Fig. 19). Aedeagus in ventral view enlarged basally and apically with apical process distinctly curved (Fig. 18) Style slender with apex slightly hooked in ventral view (Fig. 21).

*Female Genitalia:* Female unknown.

*Type:* Holotype male (USNM Type No. 34875) Huachi Beni, Bolivia, September, 1921, Mulford Biol. Expedition, Wm. M. Mann.

***Neobala metapanella*, new species**

(Figs. 22-25)

*Length:* Male 7.00-7.50 mm.

*Coloration:* Ground color of venter including legs and face stramineous to yellow, abdomen heavily marked with black, thoracic sclerites with irregular black patches, legs variably touched with dark areas, central area of clypellus black, a V-shaped black marking with apex at center of clypellus and arms extending to base of eye on either side, a large black pi-shaped marking on clypeus, and a black slightly curved band at top of face below ocelli. Ground color of crown, pronotum, and scutellum yellow to yellowish-green, crown with a transverse black band between eyes following curvature of head, pronotum with anterior margin narrowly black and four double longitudinal black stripes, each double stripe variably fused or touching especially at anterior and posterior margins, scutellum with basal angles black and a pair of irregular black longitudinal mesal stripes usually fusing distally. Ground color of forewing dark brown to black, clavus marked with a large slightly post-basal yellow-green patch and a smaller oval subapical yellow-green patch, one and sometimes a partial second oval yellow-green patch on corium slightly posterior to oval claval marking, and an irregular oval hyaline spot flanking extreme apex of clavus.

*Male Genitalia:* Genital capsule in lateral view with ventral portion of pygofer extended and terminating in a lightly setose lobe, tenth segment large with a pair of sharp extensions (Fig. 24). Macrosetae of plates in disorder. Connective approximately Y-shaped. Aedeagus in lateral view simple, but stout, and gradually narrowing in distal portion to sharp apex (Fig. 25). Style in lateral view uniformly slender with apex upturned and tapered to a sharp point (Figs. 22 and 23).

*Female Genitalia:* Female unknown.

*Types:* Holotype male (USNM Type No. 34872) Metapan, El Salvador, July 5, 1954, collector "M.S.V." Four paratype males with the same data.

*Discussion:* This species represents the first record for the subfamily in Central America. Its large size and yellow-green and black coloration are distinctive. It is not a typical *Neobala*, but it is placed here on the basis of the redefined generic definition noted in the key to genera.

***Neobala huachia*, new species**

(Figs. 26-29)

*Length:* Male 6.00 mm.

*Coloration:* Ground color of venter including legs and face yellow, abdomen and venter of thorax heavily touched with black, face with an irregular Y-shaped black area, stalk covering clypellus and most of lora, arms covering lower portion of clypeus extending laterally to eye on either side, extreme uppermost portion of clypeus with an irregular transverse wavy red-orange band between eyes. Ground color of crown, pronotum, and scutellum pale sordid gray, crown with a

red-orange irregular band between eyes, pronotum with anterior margin orange and discal area heavily suffused with brownish-orange but leaving lateral and posterior margins plus two anterior discal spots gray, scutellum heavily suffused with orange. Forewing brown hyaline touched with gray hyaline at base and apex of clavus, centrally near costal margin, and in area of outer apical cell.

*Male Genitalia*: Genital capsule in lateral view moderately elaborated, pygofer terminating in a lightly setose lobe, dorsal margin of pygofer with a large somewhat avicephaliform projection (Fig. 28). Macrosetae of plates in disorder, seemingly restricted to dorsal half. Connective approximately rectangular (Fig. 26). Aedeagus in both lateral and ventral views slender with a pair of moderately long basal processes (Figs. 27 and 29). Style in ventral view heaviest at middle with long straight undistinguished mesal lobe (Fig. 26).

*Female Genitalia*: Female unknown.

*Type*: Holotype male (USNM Type No. 34873) Huachi Beni, Bolivia, September, 1921-1922, Mulford Biol. Expedition, W. M. Mann.

*Discussion*: The color pattern and the male genitalia of this species are distinctive.

***Perubala furvata*, new species**

(Figs. 30-31)

*Length*: Male 6.00 mm.

*Coloration*: Venter including face black. Pro- and mesothoracic legs stramineous, metathoracic legs black with apex of each femur stramineous. Crown stramineous with a broad A-shaped red-orange marking, apex of "A" at apex of crown, sides extending to eyes with crossbar broken mesally. Pronotum black with a pair of discal spots and lateral and posterior margins yellowish. Scutellum black. Forewings black with color less intense apically, claval suture with a mesal yellowish stripe widened distally, and claval base irregularly pale.

*Male Genitalia*: Aedeagus broadly U-shaped, quite slender, paired apical processes with slight mesal curvature (Fig. 30). Style in ventral view fairly stout with almost a 90° bend in apical portion (Fig. 31). Rest of genital structures as in *apicimacula* Linnavuori.

*Female Genitalia*: Female unknown.

*Type*: Holotype male (USNM Type No. 34871) Tingo Maria, Peru, September 10, 1944, E. J. Hambleton.

*Discussion*: This species most closely resembles *apicimacula* Linnavuori, but the markings of the pronotum and forewings are different. The aedeagus is shorter and the paired apical appendages are longer than in *apicimacula* (Linnavuori 1959: Fig. 8A).

***Neobala permuta*, new species**

(Figs. 32-33)

*Length*: Male 5.00-5.50 mm.

*Coloration*: Not distinguishable from that of *boliviensis* Metcalf (*pallidus* Osborn) except for the markings on the posterior margin of the crown. In *permuta* the markings consist of three black spots of more or less equal size. In *boliviensis* the central spot is greatly reduced, usually appearing as a line.

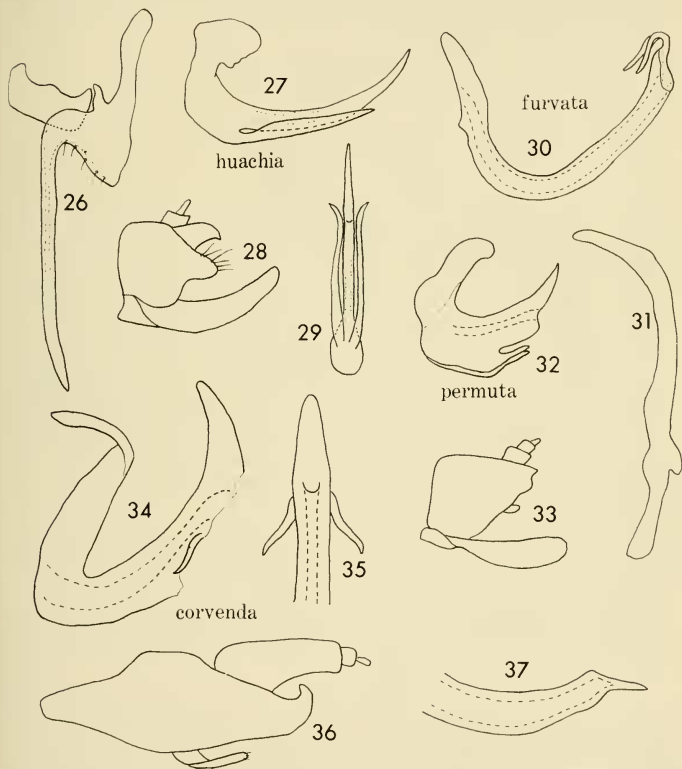
*Male Genitalia*: Genital capsule in lateral view simple, pygofer with a small lobe at middle of ventral margin and a slight expansion near apex (Fig. 33). Aede-



gus in lateral view stout, sharply narrowed near apex to pointed tip, and with a pair of comparatively short basal appendages (Fig. 32). Rest of genitalia like *boliviensis*.

*Female Genitalia*: Female unknown.

*Types*: Holotype male (USNM Type No. 34874) Santa Elena de Uairen, Venezuela, November 20, 1940, Pablo Anduze. Two paratype



***Neobala huachia* n. sp.** Fig. 26, ventral view of connective and style; fig. 27, lateral view of aedeagus; fig. 28, lateral view of genital capsule (setae of plate omitted); fig. 29, ventral view of aedeagus. ***Perubala furvata* n. sp.** Fig. 30, lateral view of aedeagus; fig. 31, ventral view of style. ***Neobala permuta* n. sp.** fig. 32, lateral view of aedeagus; fig. 33, lateral view of genital capsule (setae of plate omitted) ***Calliscarta corvenda* n. sp.** Fig. 34, lateral view of aedeagus; fig. 35, aedeagal apex ventrally; fig. 36, lateral view of pygofer and anal tube; fig. 37, stylar apex laterally. Note: Drawings made at various magnifications.

males, one same data as type, and the other Rio de Janeiro, Brazil, September 9, 1934, Souza and Lopes.

*Discussion:* This species is exceedingly close to *boliviensis* but differs in the shape of the pygofer and length of the aedeagal appendages. The color markings may or may not be reliable. Apparently *boliviensis* is a variable species because I have at hand one Brazilian male which agrees in every respect with the typical form, but the aedeagal processes are completely absent.

***Calliscarta corvenda*, new species**

(Figs. 34-37)

*Length:* Male 9.75 mm.

*Coloration:* Ground color of venter including legs and face light brown heavily marked with dark brown to black, legs banded, venter of thorax with irregular markings, sutures of face variably darkened, area below antennal ledge dark, clypellus dark mesally, clypeus variably marked with short transverse vermiculate stripes or spots. Ground color of crown, pronotum, and scutellum brownish-gray, crown with a few ill-defined touches of orange, pronotum with vague touches of orange anteriorly and irregular dark brown areas discally, anterior angles of scutellum dark. Ground color of forewings gray hyaline heavily marked with dark brown vermiculate lines often appearing as extra cross veinlets between veins, distinct unpigmented areas at base of each clavus, subapically at each clavus, directly posterior to each claval apex, and at middle of each truncated extreme apex. *Male Genitalia:* Lateral view of pygofer with dorsal margin highest mesally and a fairly blunt recurved projection apically (Fig. 36). Valve, plates, and connective typical of genus. Aedeagus in lateral view narrowly U-shaped with a pair of short appendages at about middle of highly irregular ventral margin (Fig. 34). Appendages of aedeagus best seen in ventral view (Fig. 35). Style slender with apex rather abruptly narrowed producing a sharp terminus (Fig. 37).

*Female Genitalia:* Female unknown.

*Types:* Holotype male (USNM Type No. 34869) Covendo, Bolivia, August, 1921, Mulford Biol. Expedition, Wm. M. Mann. One paratype male with the same data.

*Discussion:* The color pattern of the forewings and male genitalia are distinctive. The specific name, *corvenda*, is an arbitrary combination of letters.

REFERENCE

- Linnavuori, R., 1959. Revision of the Neotropical Deltocephalinae and some related subfamilies (Homoptera). Ann. Zool. Soc. 'Vanamo' 20(1): 1-370.